

## **Title V**

### **Model General Permit Template**

#### **SERIES 3 INTERNAL COMBUSTION ENGINES**

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#### **Template # SJV-IC-3-0**

**Fired on PUC Quality Natural Gas with a Sulfur Content of  
Less Than or Equal to 0.017% by Weight**

This template is designed to streamline the Title V permitting process for internal combustion engines meeting the above qualifications. Applicants for Title V permits choosing to use this template will only have to complete the enclosed template qualification form and submit it with their Title V application.

San Joaquin Valley Unified Air Pollution Control District  
FINAL

Title V Model General Permit Template  
Series 3 Internal Combustion Engines

Template No: SJV-IC-3-0

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FINAL DECISION DATE:

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# **SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT**

## **TITLE V GENERAL PERMIT TEMPLATE SJV-IC-3-0**

### **ENGINEERING EVALUATION**

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# Template #SJV-IC-3-0

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## I. Purpose

The purpose of the proposed template is to streamline the Title V permitting process and reduce the time required by the applicant and the District by identifying the federally applicable requirements for internal combustion (IC) engines and establishing permit conditions which will ensure compliance with such requirements. These conditions will be incorporated into the Title V permit of any facility choosing to make use of the template.

## II. Template Applicability

The template applies to any internal combustion (IC) engine which is fired on PUC quality natural gas with a sulfur content of less than or equal to 0.017% by weight. The applicability of this template can best be established by answering the questions on the Template Qualification Form attached as Appendix D.

## III. Applicable Requirements

Units may be subject to “federally enforceable” requirements as well as requirements that are enforceable by the “District-only”. Federally enforceable requirements will be enforceable by the EPA and the public through Title V permit conditions identified as federally enforceable. District-only requirements represent local or state regulations for which the EPA has no direct enforcement authority. The final Title V permits issued by the District will contain both federally enforceable and District-only requirements.

District-only requirements are not addressed in this template. Table 1, Applicable Requirements, does not necessarily include all federally enforceable requirements that apply to IC engines qualifying to use this template, and it is the source’s responsibility to determine any and all applicable requirements to which the source is subject. Generally, requirements not addressed by this template are those that require a source-specific analysis, or are covered by other templates.

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**Table 1. Applicable Requirements**

Rule Category	Rule/Regulation	Citation	Description
A	SJVUAPCD Reg. IV	4201 Section 3.1	Particulate Matter Concentration
A	County Rule	404 <sup>1</sup>	Sulfur Compounds
A	County Rule	406 <sup>2</sup>	Sulfur Compounds
A	County Rule	407 <sup>3</sup>	Sulfur Compounds
A	SJVUAPCD Reg. II	2520, 9.4.2, 9.5.2	Periodic Monitoring and Recordkeeping
B	SJVUAPCD Reg. II	2201	New Source Review Rule
B	SJVUAPCD Reg. II	2520	Federally Mandated Operating Permits
B	SJVUAPCD Reg. IV	4101	Visible Emissions

Category “A” rules contain requirements that are directly applicable to the qualifying units; compliance with these applicable requirements will be demonstrated in this engineering evaluation and assured by the template permit conditions. In section IV, Compliance, the federally-enforceable requirements from category “A” rules are listed with a discussion of how compliance with these requirements is achieved.

Category “B” rules contain federally enforceable requirements that were not addressed in this template. These may not be all of the federally enforceable requirements for this unit. Requirements from these rules must be addressed by the applicant outside of this template within the Title V application Compliance Plan form (TVFORM-004). Category “B” listing is included in this table as an informational item to assist applicants in this effort.

## IV. Compliance

This section contains a discussion of how compliance is assured with each requirement addressed in this template.

### District Rule 4201

Section 3.1 requires emissions to be at or below 0.1 grain of particulate matter per dry standard cubic foot of exhaust gas. The following analysis shows that internal combustion (IC) engines that qualify to use this template are in compliance with this particulate matter (PM) emission limit.

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<sup>1</sup> Madera

<sup>2</sup> Fresno

<sup>3</sup> Kings, Merced, San Joaquin, Tulare, Kern, and Stanislaus

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The expected concentration of PM emitted from a natural gas fired IC engine is shown by the following analysis:

$$\left[ \frac{0.0007(\text{lbPM})}{10^6(\text{Btu})} \right] \times \left[ \frac{7000(\text{grains})}{(\text{lb})} \right] \times \left[ \frac{10^6(\text{Btu})}{8710(\text{dscf})} \right] = 0.00056 \frac{\text{grain}}{\text{dscf}}$$

where  $\frac{0.0007 \text{ \#PM}}{10^6 \text{ Btu}} = \text{Emission Factor (AP-42 Table 3.2-3)}$

$$\frac{10^6(\text{Btu})}{8710(\text{dscf})} = \text{F Factor (40 CFR Appendix A Table 19-1)}$$

The preceding analysis demonstrates that the IC engines covered by this template will be in compliance with the PM limits of this rule. All of the units covered by this template shall not exceed 0.1 grain/dscf (see template permit condition #2). Compliance with District Rule 4201 is assured for all units covered by this template. Therefore, no testing or monitoring will be required for these units.

Rules 402 (Madera) and 404 (in all seven remaining counties in the San Joaquin Valley) are replaced by Unified District Rule 4201. The above analysis shows compliance with all these rules, regardless of which are SIP approved at the time of permit issuance. By using this template the applicant is requesting a permit shield from the requirements of Rules 402 (Madera) and 404 (in all seven remaining counties in the San Joaquin Valley) and District Rule 4201. See permit shield conditions #8 and #9.

### County Rule 404 (Madera), 406 (Fresno) and 407 (all six remaining counties in the San Joaquin Valley)

These county rules contain a limit on sulfur compounds. The limit at the point of discharge is 0.2 percent by volume, 2000 ppmv, calculate as sulfur dioxide (SO<sub>2</sub>), on a dry basis averaged over 15 consecutive minutes.

The following analysis shows that the internal combustion (IC) engines that qualify to use this template comply with this sulfur compound emissions limit.

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The combustion equation for natural gas is (neglecting NO<sub>x</sub> and SO<sub>x</sub> relative to O<sub>2</sub> in the exhaust):



where            Y = moles of sulfur in the fuel  
                    X = moles of excess air

solving an expression for the fraction of O<sub>2</sub> in the exhaust by volume gives:

$$\frac{X}{3 + X + (2 + X)3.78} = 0.04 \Rightarrow X = 0.523$$

where            3 = combined total moles of CO<sub>2</sub> and H<sub>2</sub>O in the exhaust  
                    0.04 = fraction of O<sub>2</sub> in the exhaust by volume

solving for Y in an expression for the fraction of SO<sub>2</sub> in the dry exhaust by volume gives:

$$\frac{Y}{1 + 0.523 + 9.54} = 0.002 \Rightarrow Y = 0.022$$

where            Y = mole fraction of S per mole of CH<sub>4</sub> combusted  
                    1 = moles of CO<sub>2</sub> in the exhaust  
                    9.54 = moles of N<sub>2</sub> in the exhaust  
                    0.002 = 2000 ppmv SO<sub>x</sub> emission limit

Use Y to calculate the weight fraction of S in 1 mole of CH<sub>4</sub>:

$$\frac{(0.022)(32.06)}{16.04 + (0.022)(32.06)} = 0.042 = 4.2\% \text{ S by weight in the fuel}$$

where            32.06 = molecular weight of sulfur (S)  
                    16.04 = molecular weight of CH<sub>4</sub>  
                    0.042 = fraction of S by weight in the fuel

Natural gas with a sulfur content of less than 4.2% by weight will satisfy each county's sulfur compounds rule.

Units qualifying to use this template must fire on PUC quality natural gas and meet the sulfur compound emission limit of 0.2% by volume, on a dry basis averaged over 15 consecutive minutes (see template permit conditions #1 and #3). For units fired solely on PUC regulated natural gas, only recordkeeping will be

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required (see template permit conditions #4 and #7). General Order 58-A of the PUC ( see Appendix C) requires all natural gas that enters the PUC pipeline for distribution to consumers contains less than or equal to 5 grains of total sulfur per 100 standard cubic feet. All natural gas that enters the PUC pipeline for distribution to consumers is tested regularly to assure that its composition conforms to these standards. This standard can be converted to an expression of weight percent of sulfur in the natural gas (ng):

$$\%S \left( \frac{lbS}{lbNG} \right) = 100 \times \left( \frac{5gr}{100ft^3} \right) \left( \frac{1lb}{7000gr} \right) \left( \frac{24.45L}{molNG} \right) \left( \frac{1molNG}{16.04g} \right) \left( \frac{453.59g}{1lb} \right) \left( \frac{0.035ft^3}{1L} \right)$$
$$= 0.017\% \text{ sulfur}$$

If the natural gas fired by this IC engine is not PUC regulated, testing and recordkeeping is required. See template permit conditions #5-7.

By using this template the applicant is requesting a permit shield from the requirements of Rule 406 (Fresno), 404 (Madera), and 407 (all six remaining counties in the San Joaquin Valley). See template permit conditions #8 and #9.

### District Rule 2520, 9.4.2, 9.5.2

Section 9.4.2 requires that monitoring be required if none is associated with a given emission limit to assure compliance. Monitoring is required for the sulfur content of natural gas (see template permit conditions #4-6).

Section 9.5.2 requires all records be maintained for at least five years. Template permit condition #7 requires that all records be maintained for at least five years.

## **V. Permit Shield**

A permit shield legally protects a facility from enforcement of the shielded regulations when a source is in compliance with the terms and conditions of the Title V permit. Compliance with the terms and conditions of the Title V permit is considered compliance with all applicable requirements upon which those conditions are based. A permit shield is requested in template permit conditions #8 and #9.



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## VI. Permit Conditions

The following conditions will be incorporated into the Title V permit of any facility choosing to make use of template #SJV-IC-3-0.

1. Sulfur compound emissions shall not exceed 0.2% by volume, 2000 ppmv, on a dry basis averaged over 15 consecutive minutes. [Rule 404 (Madera), 406 (Fresno) and 407 (6 remaining counties in the San Joaquin Valley)]
2. Particulate emissions shall not exceed at the point of discharge, 0.1 gr/dscf. [District Rule 4201; Rule 402 (Madera) and 404 (all 7 remaining counties in the San Joaquin Valley)]
3. Unit shall be fired only on PUC quality natural gas with a sulfur content of less than or equal to 0.017% by weight. [Rule 404 (Madera), 406 (Fresno) and 407 (6 remaining counties in the San Joaquin Valley)]
4. If the IC engine is fired on PUC-regulated natural gas, then maintain on file copies of all natural gas bills. [District Rule 2520, 9.4.2]
5. If the engine is not fired on PUC-regulated natural gas, then the sulfur content of the natural gas being fired in the IC engine shall be determined using ASTM method D 1072-80, D 3031-81, D 4084-82 or D 3246-81. [District Rule 2520, 9.4.2]
6. If the engine is not fired on PUC-regulated natural gas, the sulfur content of each fuel source shall be tested weekly except that if compliance with the fuel sulfur content limit has been demonstrated for 8 consecutive weeks for a fuel source, then the testing frequency shall be quarterly. If a test shows noncompliance with the sulfur content requirement, the source must return to weekly testing until eight consecutive weeks show compliance. [District Rule 2520, 9.4.2]
7. The operator of an internal combustion (IC) engine shall maintain all records of required monitoring data and support information for inspection at any time for a period of five years. [District Rule 2520, 9.5.2]
8. Compliance with permit conditions in the Title V permit shall be deemed compliance with the following applicable requirements of SJVUAPCD Rule 4201; Rules 406 (Fresno), 404 (Madera), 407 (Kern, Kings, San Joaquin, Stanislaus, Merced, Tulare). A permit shield is granted from these requirements. [District Rule 2520, 13.2]

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9. Compliance with permit conditions in the Title V permit shall be deemed compliance with the following subsumed requirements: Rules 402 (Madera) and 404 (Fresno, Merced, Kern, Kings, San Joaquin, Stanislaus, Tulare). A permit shield is granted from these requirements. [District Rule 2520, 13.2]

## APPENDIX A

### EPA COMMENTS/DISTRICT RESPONSE

## **EPA COMMENTS / DISTRICT RESPONSE**

The EPA's comments regarding this template are contained in EPA's 10/1/96 letter. A copy of this letter is available at the District.

### **EPA COMMENT**

In the future, for all model general permit templates, the public notice should clarify that this will be the public's only opportunity to comment on the specific permit conditions of the template.

### **DISTRICT RESPONSE**

The suggested clarification will be incorporated into future public notices for general permit templates.

### **EPA COMMENT**

The District should add a statement to "Category B" of the Applicable Requirements section to clarify that Table 1 does not necessarily include all the requirements that may apply to a source that qualifies to use this template.

### **DISTRICT RESPONSE**

This clarification will be incorporated into the template. The second paragraph will be amended to state that Table I, Applicable Requirements, does not necessarily include all federally enforceable requirements that apply to internal combustion engines qualifying to use this template, and that it is the source's responsibility to determine any and all applicable requirements to which the source is subject.

### **EPA COMMENT**

In Table 1, District 4801 should be listed as Category 'D' and the corresponding county SIP rules should be listed as Category 'A'.

### **DISTRICT RESPONSE**

Table I, Applicable Requirements, will be amended by:

- a. Removing SJVUAPCD Rule 4801 from the Table (it is not submitted for approval into the SIP)
- b. Adding the county SIP rules corresponding to 4801 as 'Category A'

### **EPA COMMENT**

The EPA suggests that the use of AP42 factors for PM compliance demonstration is insufficient for units with SCR and suggests an initial test or District provision of source test information to show compliance.

### **DISTRICT RESPONSE**

To assure compliance with the 0.1 gr/dscf particulate matter (PM) emission limit, the turbines qualifying to use this template are limited to firing on PUC quality natural gas (see compliance discussion on the bottom of page 3 of the template). As per telephone conversations with Kathy Ferry of Radian International, Jim McCarthy of the Gas Research Institute, and Charlie Middleton of Pacific Gas and Electric, the only constituents which are found in non-regulated gas streams and which may contribute to the formation of PM upon combustion are sulfur and occasionally, trace amounts of metals. Any metals present in the gas stream are removed during the free water knock-out stage of processing. To assure compliance the fuel sulfur must be monitored. If the fuel sulfur exceeds the PUC quality limit, then the facility is in violation of the Title V permit. The EPA also expressed concerns about gases from coal gasification, landfills, and waste water treatment facilities. Gases from these sources have been eliminated in the template qualification form. Units with SCR have also been excluded in the template qualification form.

### **EPA COMMENT**

Recordkeeping requirements for units that fire non-PUC regulated gas or diesel with supplier-certified sulfur content greater than 0.05% by weight should include fuel used and testing/sampling results.

### **DISTRICT RESPONSE**

Units qualified to use this template must fire on PUC quality natural gas with a sulfur content less than or equal to 0.017% by weight. The template requires the source maintain supplier certifications. This information must be maintained for a period of at least 5 years.

### **EPA COMMENT**

District Rule 4305 and 4351 include CO limits that are not currently federally enforceable and not made so by any streamlining action. The District should either form a District-only portion of the template including CO limits or not include them in the template while forming a permit shield to exclude the CO limits.

### **DISTRICT RESPONSE**

These rules are not applicable to internal combustion engines.

### **EPA COMMENT**

The District may want to incorporate conditions for permit renewal into template permits.

### **DISTRICT RESPONSE**

The Federal Register notice of April 24, 1996 announcing interim approval of the SJVUAPCD Rule 2520 states "Permits issued under a program with interim approval have full standing with respect to Part 70...". The requirement to reissue the general permit template every 5 years is not part of Rule 2520. Such a requirement is not currently federally applicable.

### **EPA COMMENT**

Condition should be added stating that if a source is operating under a general permit or general permit template, and is later determined not to qualify for the template, only the portion of the facility covered by the template shall be subject to enforcement action for operation without a permit.

### **DISTRICT RESPONSE**

The Federal Register notice of April 24, 1996 announcing interim approval of the SJVUAPCD Rule 2520 states "Permits issued under a program with interim approval have full standing with respect to Part 70...". The interim approval issue stated in this comment is not currently part of Rule 2520. Such a requirement is not currently federally applicable.

### **EPA COMMENT**

A time period for reporting deviations consistent with SJVUAPCD's definition of "prompt," should be included in the template.

### **DISTRICT RESPONSE**

Reporting of deviations is covered by the facility-wide template.

### **EPA COMMENT**

Compliance certification language on the template qualification form should be made to conform with 40 CFR 70 requirements.

### **DISTRICT RESPONSE**

The template will be submitted as part of a complete Title V application. The Title V application contains a Compliance Certification Form (TVFORM-005) in the SJVUAPCD Title V Permit Application Package). On the Compliance Certification Form the responsible official certifies to the truth, accuracy, and completeness of the title V application, including all supporting information.

### **EPA COMMENT**

The template does not address the NOx emission standards that apply to these units.

### **DISTRICT RESPONSE**

The NOx emission standard from District Rule 4701 is not currently federally enforceable. Once this rule is included in the SIP it will be addressed.



**EPA COMMENT**

There appear to be some typos in the permit conditions dealing with permit shields.

**DISTRICT RESPONSE**

These corrections will be made.

**EPA COMMENT**

Condition #3 should read "Unit shall be fired only on PUC quality natural gas with a sulfur content of less than 0.017% by weight."

**DISTRICT RESPONSE**

Condition #3 will be changed to read "Unit shall be fired only on PUC quality natural gas with a sulfur content of less than 0.017% by weight."

**EPA COMMENT**

Condition #4 should read "If the IC engine is fired...the operator shall maintain copies of all fuel invoices...."

**DISTRICT RESPONSE**

Condition #4 will be changed to read "If the IC engine is fired...the operator shall maintain copies of all fuel invoices...."



## APPENDIX B

### PUBLIC COMMENTS/DISTRICT RESPONSE

## **PUBLIC COMMENTS / DISTRICT RESPONSE**

Public comments regarding this template were submitted by ARCO Western Energy. A copy of the 9/3/96 ARCO Western Energy letter containing these comments is available at the District.

### **PUBLIC COMMENT**

Change the template qualification form to allow units firing on fuel with a sulfur content of 4.2% by weight use this template.

### **DISTRICT RESPONSE**

This template was designed to be used by units fired on PUC quality natural gas (sulfur content less than 0.017% by weight). Units fired on gas with a higher sulfur content will have to show compliance on the compliance plan form (TV-004) in the application package. This can be done by using this template as a model.

### **PUBLIC COMMENT**

Kern County Rule 427 and District Rule 4701 should be included in the template.

### **DISTRICT RESPONSE**

Neither of these rules are included in the current State Implementation Plan (SIP). Therefore, the requirements from these rules are not federally enforceable.

## APPENDIX C

### PUC GAS SULFUR CONTENT STANDARDS

GENERAL ORDER 58-B  
(Supplemental to General Order 58-A)

## **PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

### **HEATING VALUE MEASUREMENT STANDARD FOR GASEOUS FUELS**

Approved October 17, 1984. Effective November 16, 1984.  
(Decision 84-10-052, CII 83-11-01)

Original Order Approved December 28, 1955--Effective January 17, 1956

It is ORDERED that the following rules be adopted effective November 16, 1984 to govern all gas corporations as defined in the Public Utilities Code,\* in the determination of heating values of fuel gases. The order also is supplemental to General Order 58-A, which requires utilities to provide and maintain heating value measurement stations and shall not relieve any gas corporation from complying with the provisions of general Order 58-A.

#### **7. Purity of Gas**

##### **a. Hydrogen Sulfide**

No gas supplied by any gas utility for domestic, commercial or industrial purposes in this state shall contain more than one-fourth (0.25) grain of hydrogen sulfide per one hundred (100) standard cubic feet.

##### **b. Total Sulfur**

No gas supplied by any gas utility for domestic, commercial or industrial purposes shall contain more than five (5) grains of total sulfur per one hundred (100) standard cubic feet.

c. Test procedures used to determine the amounts of hydrogen sulfide and total sulfur shall be in accordance with accepted gas industry standards and practices.

d. When hydrogen sulfide, or total sulfur, exceeds the limits set forth in Section 7.a. and Section 7.b., the gas utility shall notify the Commission and commence remedial action immediately. The Commission shall be notified when the level of hydrogen sulfide, or total sulfur, has been reduced to allowable limits.

APPENDIX D

TEMPLATE QUALIFICATION FORM  
FOR  
TEMPLATE # SJV-IC-3-0

## Template #SJV-IC-3-0

### Title V General Permit Template Qualification Form

District Permit # \_\_\_\_\_

Please answer the questions in the table below. An internal combustion (IC) engine which meets the criteria of this table is qualified to use this template as part of a Title V application. To use this template, remove this sheet and attach to application.

Yes	No	Description of Qualifying Units
		Is this internal combustion engine fired on natural gas? If "yes", then continue to next question; otherwise STOP - you cannot use this template.
		Is this unit fired on gas from coal gasification, a landfill, or a waste water treatment facility? If "no", continue to next question; otherwise STOP - you cannot use this template.
		Is this unit equipped with selective catalytic reduction (SCR)? If "no", continue to next question; otherwise STOP - you cannot use this template.
		Is the sulfur content of the natural gas fired less than 0.017% by weight? If "yes", you qualify to use this template; otherwise STOP - you cannot use this template.

Based on information and belief formed after reasonable inquiry 1) the information on this form is true and correct and 2) the facility certifies compliance with this template's permit conditions:

\_\_\_\_\_  
Signature of Responsible Official

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of Responsible Official (Please Print)

**TQF-3**